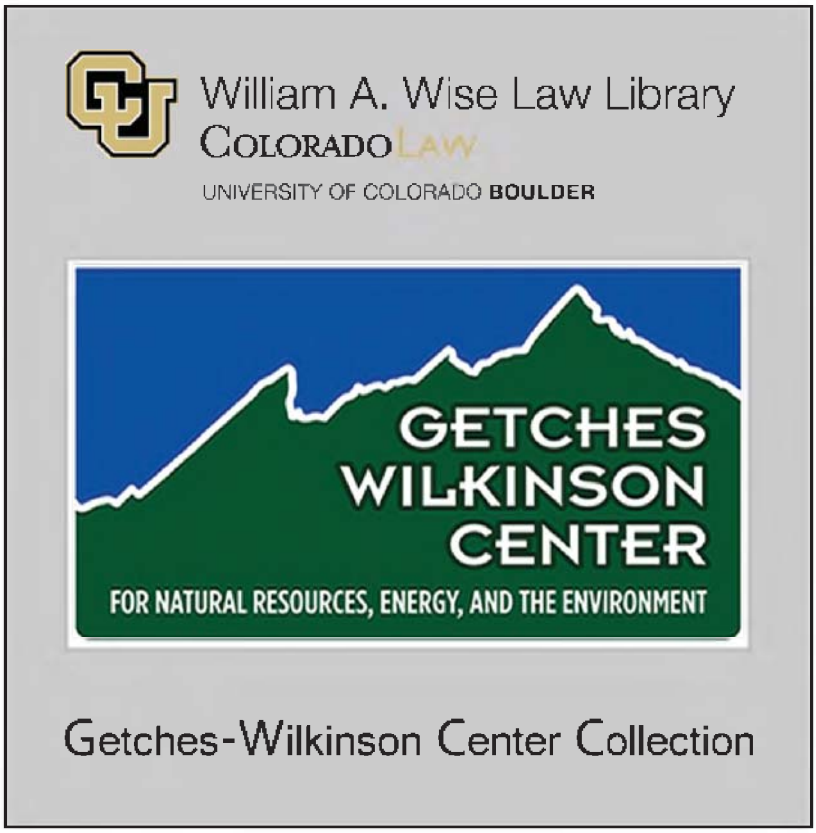
8-5-2004

Day 2: Thursday, August 5, 2004: Valmont Power Plant

Valmont Power Plant



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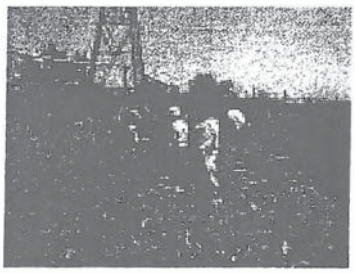
Valmont Power Plant

View of the Valmont Power Plant

Septic tank that precedes the wetland cells

Wetland cells



Team during wetland investigation

Valmont Power Plant Statistics	
Nearest Town:	Boulder
County:	Boulder
River Basin:	South Boulder Creek
Receiving Water Body:	Hillcrest Lake
Year Online:	1993
Population:	100
Elevation (feet):	
Design Flow (mgd):	0.50
Average Flow (mgd):	0.25
Size (acres):	0.03

Facility Description

The Valmont Power Plant has two separate subsurface wetland treatment systems. These subsurface wetland cells treat on-site domestic wastewater from office buildings. Each wetland follows a septic tank.

Background Information

The Valmont Power Plant had experienced problems with its leach field. A cost analysis determined the implementation of a subsurface wetland system to be the cheapest option by far. to implement subsurface wetlands in place of traditional leach fields. These subsurface wetlands have been operating since 1993, with no reported problems.

Energy Analysis

No energy is consumed by the wetland treatment systems.

Construction Cost

The cost to construct the wetland systems was $450,000.

Wetland Design

Objectives

The wetlands were designed to polish the septic overflow. In particular, the wetlands reduce the BOD and TSS to permitted discharge levels. The wetlands were sized to provide adequate detention time for 0.003 mgd.

Size

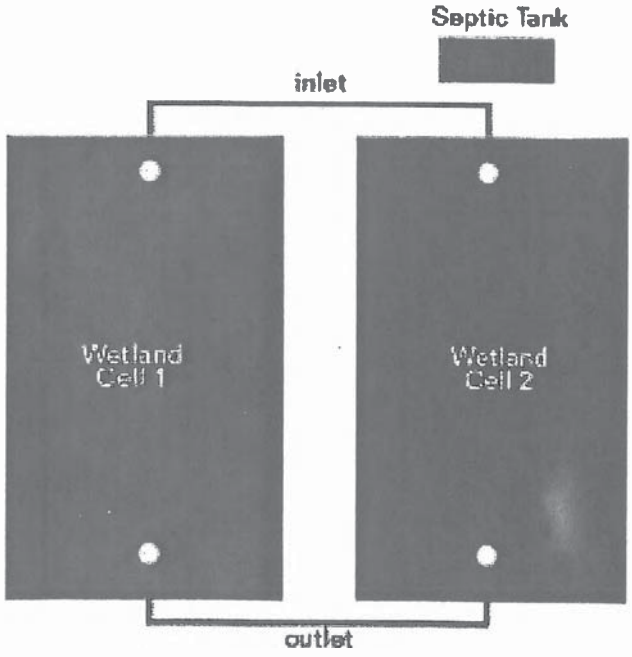
The wetlands cells are 68' by 22'.

Shape

The rectangular wetland cells have an aspect ration of 3:1.

Hydraulics

A splitter box collecting effluent from the septic tank was removed and currently septic overflow flows directly into the wetland cells. Perforated pipes are buried at the inlet to the wetland and flow by gravity through the system. Groundwater infiltration into the pipeline between the facility and the septic system has led to excess flows into the system.



Treatment Goals

Permitted Discharge Limitations	
BOD_5	30 mg/l (30-day ave)
TSS:	105 mg/l (30-day ave)
PH, su (min – max)	6.5 – 9.0 (Daily Max)
Chlorine Residual:	0.5 mg/l (Daily Max)
Fecal Coliform Bacteria:	2,000 organisms per 100 ml (Daily Max)

Water Quality Data

No water quality data are available for this site. The discharge permit requirements were modified for this site in order to consolidate outfall testing. Since the discharges from the wetland systems are a very small portion of the total flow discharged from this facility, and the discharge from the wetlands is into an internal source, it was determined that discharge monitoring tests will be taken at the final discharge from the property.

General Ecological Setting

The Valmont Station wetlands are flat, rectangular basins occurring in Boulder County at Excel Energy's Valmont Power Station. The wetlands are located adjacent to the power plant and are surrounded to the north, east, and south by Leggett, Valmont, and Hillcrest Reservoirs. The reservoirs support large populations of fish, waterfowl, and migratory birds.

Cell Vegetation

Valmont Station contains constructed wetlands at two sites. Site 2a has two cells, each of which is approximately ¼ acre. Cell 1 is dominated by cattail (*Typha latifolia*) and softstem bulrush (*Scirpus tabernamontanae*) with curly dock (*Rumex crispus*). Cell 2 has two vegetation communities. Plant community 1 covers comprises about 70 percent of the vegetation cover in cell 2. This community is dominated by reed canarygrass (*Phalaris arundinacea*), curly dock, crack willow (*Salix fragilis*), and hawthorne (*Crategeus ravalii*). Plant community 2 covers the remaining 30 percent of the wetland and is dominated by Canada thistle (*Cirsium arvense*), prickly lettuce (*Lactuca seriola*), catnip (*Nepeta cataria*), willowherb (*Epilobium ciliatum*), cheatgrass (*Bromus tectorum*), and mullein (*Verbascum thapsus*) with a few golden currant (*Ribes aureum*) individuals. Plant community 1 occurs in areas of the cell where water is close to or above the gravel surface. Plant communities 2 and 3 occur where the water surface is lower.

Site 2b has one cell (approximately ¼ acre)that has two vegetation communities. Cattail, ragweed, softstem bulrush, and Canada thistle cover 90 percent of the cell, and a curly dock/Canada thistle community with ragweed, prickly lettuce, and golden currant occupies 10 percent of the cell.

Planting/Seeding

Cattail, softstem bulrush, common reedgrass (*Phragmites australis*), and reed canarygrass (*Phalaris arundinacea*) were planted, mulched, and fertilized. Upland areas were also seeded with native species. Of the species planted, cattail and reed canarygrass were the most successful, and dominate most of the site. Common reedgrass was not recorded in either cell.

Weeds

In site 2a, cells 1 and 2, Canada thistle, cheatgrass, prickly lettuce (*Lactuca seriola*) and mullein (*Verbascum thapsus*) are present in the reed canarygrass community, and occur around the edges of the cattail community. In cell 2, the Canada thistle community is dominated by Canada thistle. It also contains about 5 percent cover by cheatgrass. Canada thistle, mullein, and cheatgrass (also called downy brome) are State Noxious Weeds. All of these weed species are particularly invasive in areas of recent disturbance, and spread quickly. These weeds prevent the establishment of, or displace, native species and have low value as wildlife habitat.

Maintenance Issues

There were no unusual maintenance issues related to plant health at this site. The cell inflow and outflows are periodically cleaned, and the wetlands have been burned in the past, although not frequently.

Piping within the system must be roto-rooted, and the septic tanks are pumped on an annual basis.

Wildlife

The constructed wetland at Valmont Station provides habitat for songbirds. Red winged blackbirds were observed at the site visit. Geese were a concern during wetland establishment and may still use the site. Although the wetlands are not structurally diverse, their location adjacent to the three reservoirs make them more valuable to songbirds and waterfowl.

Wetland Biodiversity Functional Assessment

Sediment/nutrient/toxicant removal rated high. General wildlife habitat rated moderate, and all other parameters rated low. This wetland received 35 percent of the total possible function points, and its overall function was rated a category III.

Wetland biodiversity functional assessment

Function and Value Variables	Functional Points (0.1 to 1)	Possible Points
General Wildlife Habitat	0.3 (low)	1
General Fish/Aquatic Habitat	NA	1
Production Export/Food Chain Support	0.6 (mod.)	1
Habitat Diversity	0.1 (low)	1
Uniqueness	0.1 (low)	1
Total Points	2.1 (42%)	5
Wetland Category (I, II, III, or IV)	III	

Human Use

The wastewater wetland is part of a restricted public access area, although some students from the Boulder area have visited the site. Xcel Energy, formerly the Public Service Company of Colorado, conducts tours of this historical power plant for school or other community groups. The wetlands at this site have moderate aesthetic value. The wetlands are dominated by a mix of vegetation, and are located adjacent to large reservoirs.

Overall Site Comments

This site functions as intended for wastewater treatment and it also has some wildlife value both because of the varied plant communities in the wetland cells and because it is located adjacent to large reservoirs. This subsurface wetland system has been in operation over 12 years without any significant problems.